





EU CORSIA Africa and Caribbean

Key elements, Offsetting and CORSIA eligible emissions units Capacity building session for stakeholders from Namibia

Working for quieter and cleaner aviation.

Your safety is our mission.

22.07.2024-26.07.2024



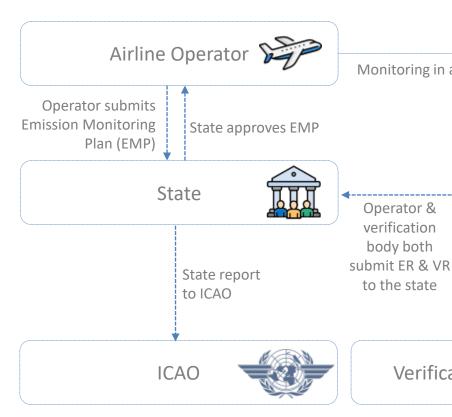






RECAP session DAY N. 1

CORSIA and MRV



Monitoring of CO₂ emissions throughout Monitoring in accordance with EMP

Annual ER

Annual VR



the year

Develop Emissions Report (ER)

Verification Body



Verify ER & develop Verification Report (VR)



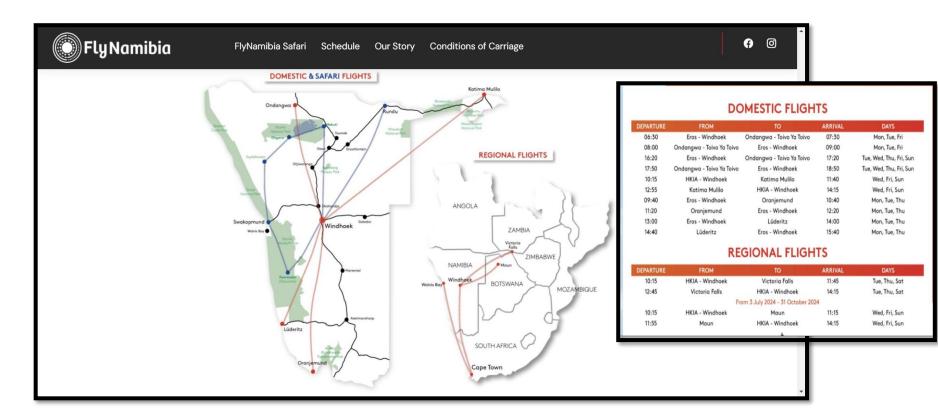
International flight and domestic flight

International flight: the operation of an aeroplane from take-off at an aerodrome of a State or its territories, and landing at an aerodrome of another State or its territories (Only between ICAO members)

Domestic flight: operation of an aeroplane from take-off at an aerodrome of a State or its territories, and landing at an aerodrome of the same State or its territories. Not covered by CORSIA



Domestic flight versus International flight





MRV applicability and offsetting exemptions

Exemptions:

MRV and Offsetting Exemptions

- \Rightarrow \leq 10,000 t CO₂/yr
- → ≤ 5,700 kg of Maximum Take Off Mass
- + Humanitarian, medical and Firefighting ops (Preceding and following flights)
- → Helicopter, Police, Military, Customs and State aircraft

Offsetting Exemptions (Second Phase)

→ LDCs, SIDS, LLDCs, or

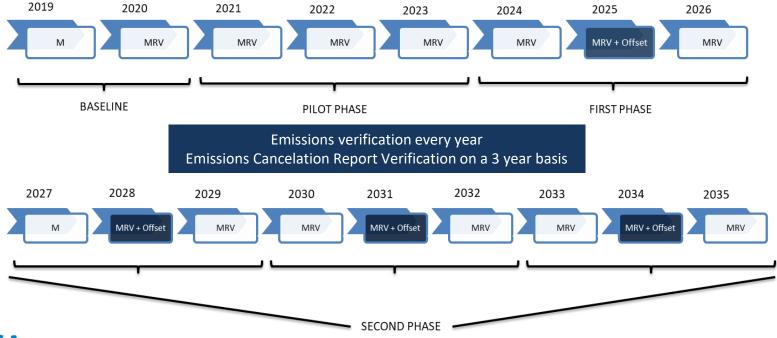
States that are not part of the list of States that account for 90% of total RTKs when sorted from the highest to lowest amount of individual RTKs, and whose individual share of the international activities in RTK in year 2018 is below 0.5% of total RTKs;

State Grouping http://unohrlls.org/



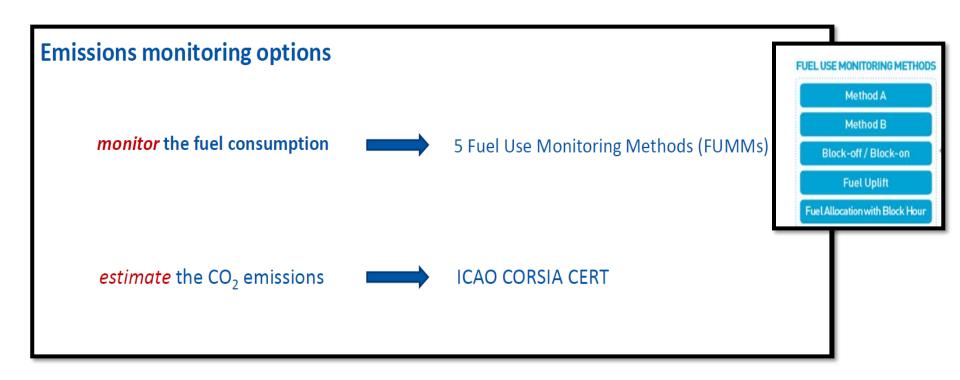
Administration Procedures

- → Monitoring, Reporting and Verification (MRV) on an annual basis
- → Offsetting requirements on a three-year basis



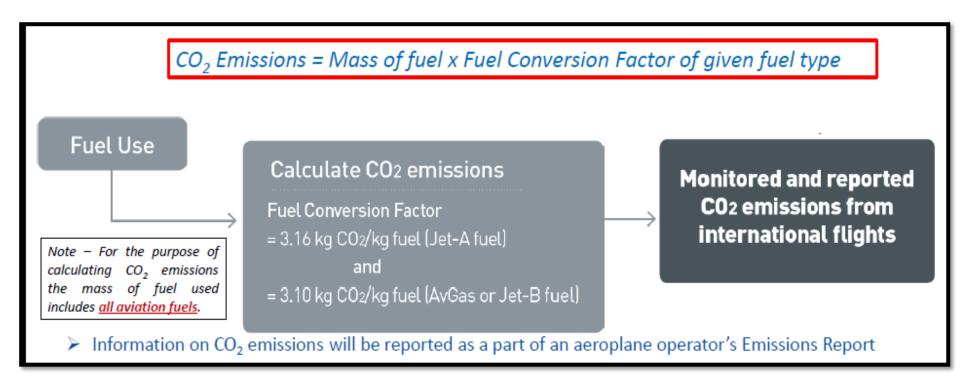


Monitoring





Calculation of CO2 emissions from fuel used





CORSIA PROCESS IN 2024

-1 January to 30 April: Aeroplane operators to compile 2023 CO2 emissions data to be verified by verification bodies



-by 30 April: Aeroplane operators and verification bodies to submit to States the verified Emissions Reports and associated Verification Reports for 2023 CO2 emissions.



-by 30 June: States to notify ICAO of their intention to participate in the CORSIA offsetting requirements from 1 January 2025 (for first time participation only).



-by 31 July: States to conduct an order of magnitude check of the verified 2023 Emissions Reports, including any filling of data gaps in case of non-reporting by aeroplane operators, and use the CCR to submit aggregated 2023 CO2 emissions data and, if applicable, information on CORSIA eligible fuels.



-by 30 November: States to notify to ICAO new accredited VB in the State, if any.

States to notify to ICAO attributed AOs





Question session

Q1: What does "Phased Implementation" mean

- 1. That countries can decide whether or not to implement Annex 16, Volume IV and they can do it in phases
- 2. That it is up to Aeroplane Operators whether to implement MRV starting in 2021 since the first phase is voluntary
- 3. That all States have to participate in CORSIA from 2027 unless exempted.



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- 3. That all States have to participate in CORSIA from 2027 unless exempted.



Q2: CORSIA exemption

- 1. All States can be exempted from CORSIA applicability unless they volunteer
- 2. The aeroplane operators will inform the Civil Aviation to which they are attributed if they are exempted from CORSIA applicability
- 3. Based on economic-social criteria and aviation criteria



Q2: CORSIA exemption

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- 3. Based on economic-social criteria and aviation criteria



Q3: CORSIA MRV AND OFFSETTING

- 1. All AOs shall submit from 2021 ER to the SA to which they are attributed and the offsetting proof
- 2. The AOs are required to submit annually 2 reports to the State Authority to outline they operate international flights and they MRV
- 3. Offsetting of CORSIA started in 2021 and AOs did not have any offsetting reference in their ER of 2019 and 2020



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Q4: ACCREDITATION under CORSIA

- 1. The Civil Aviation Authority shall notify to the NAB the competence criteria to accredit the Verification Body conducting the verification under CORSIA
- The National Accreditation Body shall be the only competent Body to decide on the CORSIA Accreditation of the Verification Body
- 3. The Civil Aviation Authority shall check the ISO 14065 requirements of the Verification Body accredited by the NAB before reporting to ICAO each year by 30.11.202x



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Q5: RTK and effects CORSIA/exemption

- 1. If the RTK of a state in 2019 is higher than the one used by ICAO for the exemption criteria, the state has to join CORSIA
- 2. The RTK data shall be submitted every year to the SA with the Emissions Report so that the SA can inform you if you are exempted from MRV and offsetting applicability
- 3. 2018 RTK is used for determining the participation of States in the second phase of the CORSIA



Q5: RTK and effects CORSIA/exemption

- 1. If the RTK of a state in 2019 is higher than the one used by ICAO for the exemption criteria, the state has to join CORSIA
- 2. The RTK data shall be submitted every year to the SA with the Emissions Report so that the SA can inform you if you are exempted from MRV and offsetting applicability
- 3. 2018 RTK are used for determining the participation of States in the second phase of the CORSIA



Q6: Are all Aeroplane Operators registered in a State required to undertake MRV?

- 1. Yes
- 2. No



Q6: Are all Aeroplane Operators registered in a State required to undertake MRV?

- 1. Yes
- 2. No







Emissions Monitoring Plan and Emissions Report

Monitoring of CO2 emissions



An aeroplane operator shall monitor and report its fuel consumption from international flights in accordance with an eligible monitoring method approved by the state to which it is assigned.

The monitoring method selected/quoted in the emissions monitoring plan shall be used for the entire compliance period.



The Emissions Monitoring Plan (EMP) establishes detailed, complete and transparent documentation of an operator's methodology and is an essential component of the monitoring system established by the relevant rules.

The EMP is a collaborative toll between the aircraft operator and its assigned state.

ICAO recommended an EMP template as per ETM

Draft and Submission to SA

 The AO shall draft and submit the EMP to the SA to which it is attributed

Revision and approval

The SA receiving the EMP shall approve it

Material changes and reapproval

 In case of material change the AO shall resubmit the EMP to the competent SA. The SA shall revise it and approve



EMP Process

Process and schedule for the development, review and approval of the EMP



PREPARATION AND SUBMISSION

An aeroplane operator submits an Emissions Monitoring Plan for consultation and review by the State to which it is attributed.



 A new entrant aeroplane operator shall submit an EMP to the State within three months of falling within the scope of applicability of MRV requirements.



REVIEW AND APPROVAL

The State reviews and approves the Emissions Monitoring Plan.



3

REVISIONS AND UPDATES

An aeroplane operator resubmits the Emissions Monitoring Plan for review and approval by the State if a material change is made to the information contained within the Emissions Monitoring Plan.



CORSIA

EMISSIONS MONITORING PLAN (EMP)

CONTENTS

- 1 Version control of Emissions Monitoring Plan
- 2 Aeroplane operator identification and description of activities
- 3 Fleet and operations data
- 4 Methods and means for calculating emissions
- 4.1 Fuel Use Monitoring Method: Method A
- 4.2 Fuel Use Monitoring Method: Method B
- 4.3 Fuel Use Monitoring Method: Block-off / Block-on
- 4.4 Fuel Use Monitoring Method: Fuel Uplift
- 4.5 Fuel Use Monitoring Method: Fuel Allocation with Block Hour
- 4.6 ICAO CORSIA CO. Estimation and Reporting Tool (CERT)
 - 5 Data management, data flow, control system, risk analysis and data gaps

Template Information

Template provided by: Version (publication date):

Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.



Identification of aeroplane operator and description of activities

- Name and address of operator
- Legal representative
- Information to attribute the Aeroplane Operator to a State
- ICAO designator
- AOC (Air Operator Certificate)
- Place of legal registration
- Details of the ownership structure
- Parent-subsidiary relationship, if applicable
- Contact Information for Person Responsible
- Description of the aeroplane operator's activities
- Planned/Unscheduled
- Passenger/Freight/Executive
- Geographical area of operations



Fleet and Operation data

- List of aircraft types and fuel type used, including leased aircraft
- Information used for the assignment of international flights:
- -ICAO designation
- -Registration marks
- -Aircraft owner
- Procedures on how changes in the fleet will be followed
- Procedures on how specific flights will be tackled
- International Flight Identification Procedures
- List of States Pairs
- Procedures for determining flights subject to falling under CORSIA requirements
- Exempted flights Domestic, humanitarian, medical or firefighting flight identification procedures



Methods and means to calculate emissions

- Operator using CERT :
 - Estimate CO2 emissions for all international flights
 - CERT input method
- Operator using one of the 5 FUMM:
- Fuel Used Monitoring Method (FUMM) selected
- FUMM Specification per Aircraft Type
- Procedures for determining and recording fuel density values
- Fuel consumption monitoring systems and procedures for owned and leased aircraft

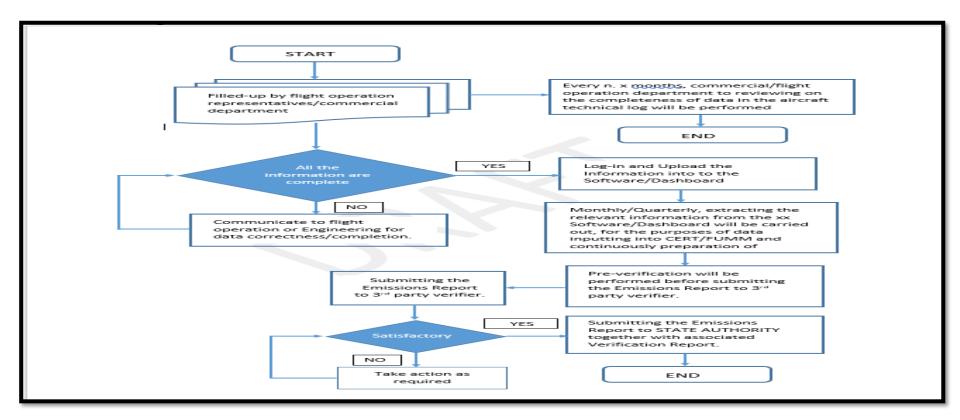


Data
Management,
Data flow,
Control System,
Risk Analysis
and Data Gaps

- Data management roles, responsibilities and procedures;
- Procedures for managing data gaps;
- Documentation and record keeping plan;
- Assessing the risks associated with data management processes and how to manage significant risks;
- Revisions to the EMP in case of change/ and in case of material changes
- Procedures for notifying in the emissions report non-material changes
- Data flow diagram summarizing the systems used to record and store data associated with CO2 monitoring and reporting.



Example of Data Flow Chart- Annex to be the EMP







Question session

Q1: The reporting exercise is to be done on an annual basis from the Aeroplane Operator to the State Authority

- 1. True
- 2. False
- 3. Partially true



Q1: The reporting exercise is to be done on an annual basis from the Aeroplane Operator to the State Authority

- 1. True
- 2. False
- 3. Partially true



Q2: Shall the Aeroplane Operator submit the EMP and ask for State Authority approval every year?

- 1. Yes
- 2. No
- 3. Only if they don't use CERT



Q2: Shall the Aeroplane Operator submit the EMP and ask for State Authority approval every year?

- 1. Yes
- 2. No
- 3. Only if they don't use CERT



Q3:EMP and CORSIA

- 1. The AO shall submit the verified EMP to State Authority once it falls under the scope of the MRV applicability
- 2. The AO shall submit the verified EMP to the State Authority within three months of falling within the scope of applicability of MRV requirements
- 3. The AO shall submit the EMP to the State Authority within three months of falling within the scope of applicability of MRV requirements



Q3:EMP and CORSIA

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CORSIA

EMISSIONS REPORT (ER)

CONTENTS

- 1 Aeroplane operator identification and description of activities
- 2 Underlying basic information of the Emissions Report
- 3 Aeroplane fleet and fuel types
- 4 Fuel density
- 5. Reporting
- 5.1 Reporting State pairs
- 5.2 Reporting Aerodrome pairs
 - 6 Data gaps

Template Information

Template provided by:
Version (publication date)

Note: For the purpose of this template, international flight is defined as in Annex 16, Volume IV, Part II, Chapter 1, 1.1.2, and Chapter 2, 2.1.



Aeroplane
Operator
Identification
and Description
of the activities

- Name and address of operator
- Legal representative
- Information to Assign the Aircraft Operator to a State
- > ICAO code
- Aircraft registration
- ICAO Code and Aircraft Registration
- Verification Body
- Accreditation Details



Underlying basic information of the ER

- Reporting year
- End of reporting period
- Date of issue publication
- Emissions report version
- Information related to the monitoring plan (version, approval date, last update, if there were multiple monitoring plans used, etc.)
- ICAO CORSIA Fuel Consumption Monitoring Method and/or CO2 Emissions Estimation and Reporting Tool (CERT)
- Fuel allocation per Block Hour



Airplane fleet and fuel Type

- Information on fleet type
 - ICAO AIRCRAFT TYPE DESIGNATOR (ICAO CODE)
 - Registration mark
 - Owned or Leased
 - Fuel used (Jet-A, Jet-A1, Jet-B, AvGas

Density

- Fuel density (standard or actual or both)
- Consistency (yes or no)

Aggregation level of reported data

- Level of aggregation of data
 - Aggregation at State Pairs
 - Aggregation at Airdrome Pairs



Declaration at
State Pairs
Level/Airdrome
level

- Summary of reported international flights and emissions
 Total CO2 emissions from international flights
 Total CO2 emissions from flights subject to offsetting
 Total number of international flights during the reporting period
 Total number of international flights subject to offsetting
 CORSIA eligible fuel claimed
- State Pairs (table listing all State pairs on which international flights were performed, with total n. of flights and the amount of CO2 emissions



Aggregation at State Pairs

Table listing all State Pairs

State of departure State of	f arrival CO2 emissions estimated with CERT?	Total No. of flights	Total mass of fuel (in tonnes)		Total CO2 emissions (in tonnes)	Subject to offsetting requirements?
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Aggregation at Aerodrome Pairs

Table listing all Aerodrome Pairs

D	Departure Arrival			CO2 emissions	Total	Fuel	Total amount	Fuel	CO2 emissions	Subject to
ICAO airport code	State	ICAO airport code	State	estimated with CERT?	No. of flights	type (*)	of fuel used (in tonnes)	conversion factors	(in	offsetting equirements?



Data Gaps

- Did any data gaps occur during the reporting year?
- Is the Threshold of 5 per cent for data gaps exceeded?
- Percentage of data gaps
- List of data gaps if the 5% threshold has been exceeded in the reporting year



Q1: FUMM AND EMP

- 1. The AO shall describe in the ER the FUMM selected and outline the rationale of why CERT was not used
- 2. The AO shall describe in the ER the FUMM selected and wait for the approval from the SA to which it is attributed
- 3. The AO shall not describe all FUMM in the EMP



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- 3. The AO shall not describe all FUMM in the EMP



Q2:CALCULATION OF CO2 FROM FUMM

- 1. The AO is required to determine the CO2 emissions by using Mass fuel x conversion factor
- 2. The AO is required to determine the CO2 emissions by using CERT tool
- 3. The AO is required to determine the CO2 emissions by using the results of the reporting exercise



Q2:CALCULATION OF CO2 FROM FUMM

- 1. The AO is required to determine the CO2 emissions by using Mass fuel x conversion factor
- 2. The AO is required to determine the CO2 emissions by using CERT tool
- 3. The AO is required to determine the CO2 emissions by using the results of the reporting exercise



Q3: DATA GAPS and CORSIA

- 1. The AO can use different data sources, such as air traffic control (ATC) records, flight logs, flight plans, etc., for addressing data gaps and for estimating CO2 emissions
- 2. The AO using a Fuel Use Monitoring Method, shall fill data gaps using the ICAO CORSIA CERT, provided that the data gaps during a compliance period do not exceed the data gap thresholds
- 3. Upon acceptance by the SA, the AO using a Fuel Use Monitoring Method, shall fill data gaps using the ICAO CORSIA CERT, provided that the data gaps during a compliance period do not exceed the data gap thresholds



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CERT simulation

- -CERT for MRV applicability
- -CERT to generate ER
- -CERT to gap filling

ICAO CERT

ICAO CORSIA CO₂ Estimation and Reporting Tool (CERT) is a tool developed by ICAO and it is a key element of CORSIA implementation

CERT can be used for:

- assess the eligibility to use CERT;
- assess if the AO is falling under the MRV applicbaility;
- fill in data gaps.

The AO can input data in CERT based on:

- Block time input"
- Great Circle Distance".

CERT is updated every year by ICAO (generally new version around November)



CORSIA

CERT

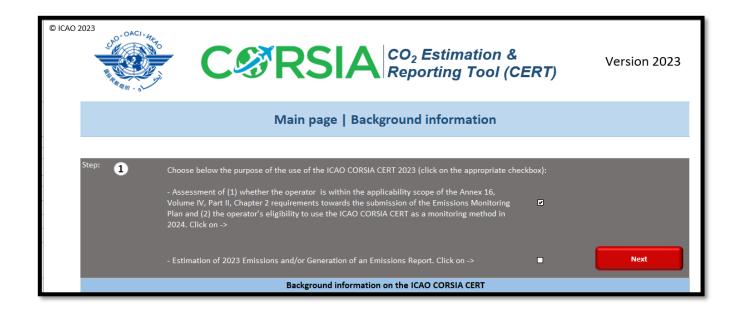


Who can use CERT/when/why

Year of validity	2019	-2020	2021	-2035
Aeroplane operators international	То	tal	Offse	etting
CO ₂ emissions (tonnes)	< 500,000	≥ 500,000	< 50,000	≥ 50,000
Preliminary CO ₂ assessment	✓	✓	✓	✓
CO ₂ estimation & reporting	✓	Not eligible to use CERT **	✓	Not eligible to use CERT
Filling data gaps	✓	✓	✓	✓



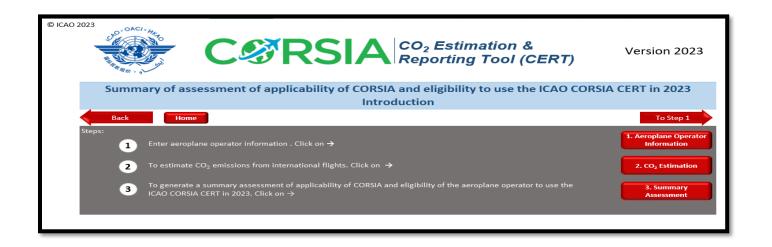
Assessment for MRV applicability





Summary of assessment of applicability

Identification of the AO:





Assessment of the AO – Step 1

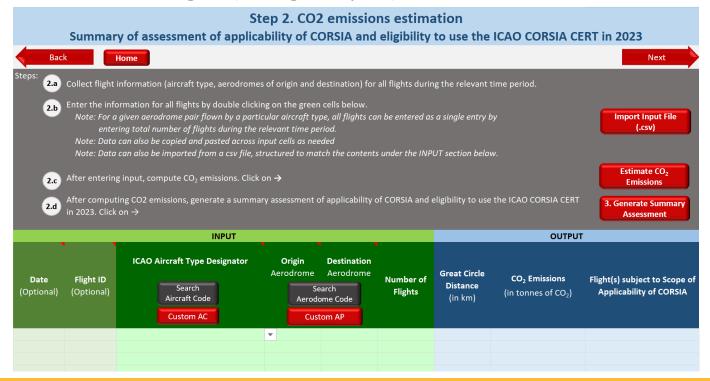
Identification of the AO:





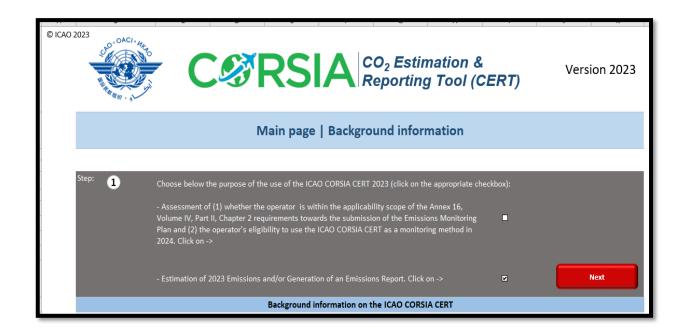
Step 2

Input data based on ICAO aircraft type designator, origin aerodrome, destination aerodrome and number of flights (dark green part)





CERT to estimate emissions/generate report





CERT to estimate emissions

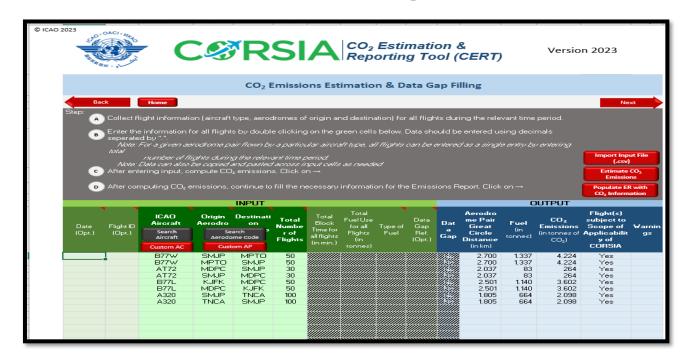
CERT using input data at GREAT CIRCLE DISTANCE INPUT:

CO2 Estimation and Reporting for 2023 In	troduction
Back	Next
Step: In accordance with the Aeroplane Operator's Emissions Monitoring Plan (EMP), please answer	the following questions;
- Is the Aeroplane Operator eligible and using the ICAO CORSIA CERT as primary mon	itoring method?
If yes, are you using;	
Great Circle Distance input ?	
Block Time input ?	•
 Is the Aeroplane Operator using Fuel Use Monitoring Methods as a primary monitor using the ICAO CORSIA CERT for data gap filling? 	ring method and
If yes, are you using;	
Great Circle Distance input ?	•
Block Time input ?	•
- Are you using the ICAO CORSIA CERT to generate an Emissions Report for 2023?	Next



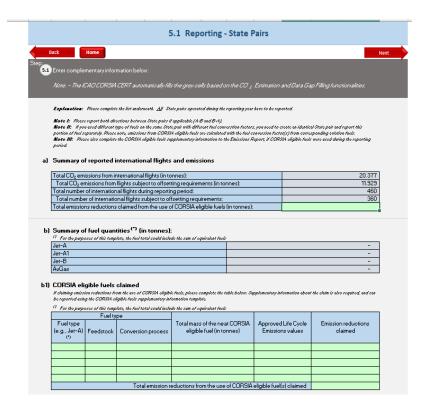
CERT

Results – Estimation of emissions using GCD INPUT





CERT- results

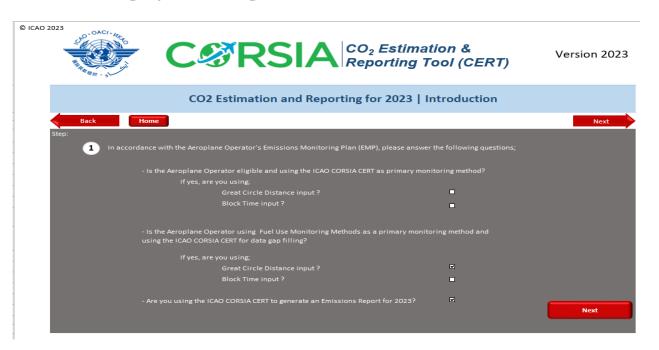


(7) For the purposes of this te	mplate, the fuel total could inc	lude the sum of	equivalent fo	iels				
State of departure	State of arrival	CO ₂ emissions estimated with CERT?	Total No. of flights	Fuel type ^(*)	Total mass of fuel (in tonnes)	Fuel conversion factors	Total CO ₂ emissions (in tonnes)	Subject to offsetting requirements?
Dominican Republic	Suriname	ves	30				264	Yes
Dominican Republic	United States	ves	50				3,602	Yes
Netherlands	Suriname	yes	100				2.098	Yes
Panama	Suriname	ves	50				4.224	
Suriname	Dominican Republic	yes	30				264	Yes
Suriname	Netherlands	yes	100				2.098	Yes
Suriname	Panama	ves	50				4.224	
United States	Dominican Republic	yes	50				3.602	Yes



CERT for data gaps

Use CERT for data gaps using GCDE





CERT for data gaps

Results – Estimate emissions for data gaps:





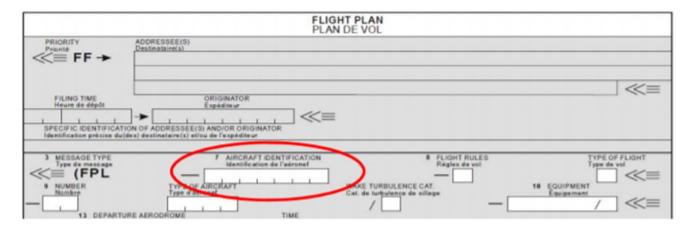


RECAP from DAY n. 2

Attribution of Flights to Aeroplane Operators

→ Each international flight is attributed to a single aeroplane operator based on the information provided in the Flight Plan

FLIGHT PLAN? Information that the operator provides to air traffic services relative to intended operations





Attribution of Flights to Aeroplane Operators

→ ICAO Designator: When Item 7 (aircraft identification) of the flight plan contains the ICAO Designator the flight is attributed to the aeroplane operator that has been assigned this Designator (ICAO Designators contained in ICAO Doc 8585)

ICAO DESIGNATOR?: three-letter code for use on aeronautical telecommunication service and for aircraft identification by air traffic control.

E.g: FLY NAMIBIA: ICAO CODE: WAA (not IATA WW)



Attribution of Flights to Aeroplane Operators

→ Registration marks: When Item 7 (aircraft identification) of the flight plan contains the registration mark of an aeroplane that is explicitly listed in an Air Operator Certificate (AOC or equivalent) issued by a State, that flight is attributed to the aeroplane operator that holds the AOC

REGISTRATION MARKS? it is a code unique to a single aircraft, indicates the aircraft's country of registration

AIR OPERATOR CERTIFICATE? it authorizes an operator to perform commercial operations

→ Other: if not identified via previous points, that flight shall be attributed to the aeroplane owner



Attribution of Aeroplane Operator to a State

- → Each aeroplane operator reports its CO2 emissions to a single State. Rules for attributing an aeroplane operator to a State are based on:
 - → If the operator has an ICAO Designator → The "Notifying State"
 - → If not but has an AOC → The State that issued the AOC
 - → If none of the above ⇒The State where the operator is registered as juridical person, or the State of residence if it is a natural person



Record Keeping

→ The Aeroplane Operator shall keep relevant records for a period of 10 years. It should include a documentation and record keeping plan in its Emissions Monitoring Plan and where the operator will store CORSIA-relevant information.

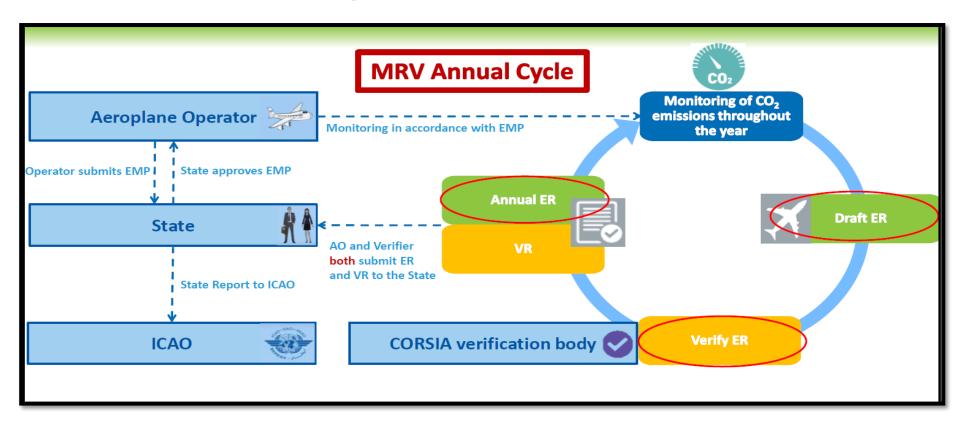


From DAY n. 2

- Approved EMP is the basis for emissions monitoring
- Only eligible FUMMs can be used to monitor fuel consumptions
- ICAO CORSIA CERT is an approved tool to estimate and report CO₂
 emissions by eligible AOs
- ER is to be verified annually



ER in the MRV Cycle





Generating the Report Using CERT

→ When an operator defines in the EMP that CERT will be the main emissions reporting method, CERT can be used to generate the final ER template

- → This functionality allows AO
 - → to fill in all the fields that would otherwise be filled in in the ICAO template
 - → To make an estimate of the emissions inputting flight Info
 - → To generate the summary of emissions per Aerodrome/State pair
 - → To generate the final report in Excel or PDF format



Using CERT to fill in Data Gaps

- → When using a fuel monitoring method, gaps in emissions-related data can occur due to various reasons
 - → Irregular operations
 - → data feed issues
 - → system failures
 - → Human error

→ They can be identified at various stages:

By the AO when preparing the Emissions Report/Pre-verification By the VB when receiving and assessing the Emissions Report By the State in its Order of Magnitude Check



Q1: Are all ICAO Member States obliged to harmonise their legislation/regulation in line with ICAO's SARPs Annex 16, Volume IV, even if at different level and as per different phase of CORSIA implementation?

- 1. Yes
- 2. No
- 3. It depends on the CORSIA phase



Q1: Are all ICAO Member States obliged to harmonise their legislation/regulation in line with ICAO's SARPs Annex 16, Volume IV, even if at different level and as per different phase of CORSIA implementation?

- 1. Yes
- 2. No
- 3. It depends on the CORSIA phase



Q2: CORSIA Implementation Elements:

1. Are available for States only if they wish to use them

2. Are applicable to all States as they are referenced in SARPs to implement CORSIA

3. Are applicable to all States if refering to them in their national regulation



Q2: CORSIA Implementation Elements:

1. Are available for States only if they wish to use them

2. Are applicable to all States as they are referenced in SARPs to implement CORSIA

3. Are applicable to all States if refering to them in their national regulation



Q3: STATE with no AO

- 1. A state with no attributed AO can join CORSIA
- 2. A state with no attributed AO has to report only with MRV
- 3. A state with no attributed AO can't join CORSIA



Q3: STATE with no AO

- 1. A state with no attributed AO can join CORSIA
- 2. A state with no attributed AO has to report only with MRV
- 3. A state with no attributed AO can't join CORSIA



Q4:CCR

- 1. The AO shall send the AOC to ICAO through the CCR by 30th June 2024
- 2. The SA shall update the CCR with the new AOs attributed to it every year by 30.11.2024
- 3. The SA shall create the credentials in the CCR for the AO to upload all information related to their emissions from international flights in a given year



Q4:CCR

- 1. The AO shall send the AOC to ICAO through the CCR by 30th June 2024
- 2. The SA shall update the CCR with the new AOs attributed to it every year by 30.11.2024
- 3. The SA shall create the credentials in the CCR for the AO to upload all information related to their emissions from international flights in a given year





Exercise session

Fuel Used Monitoring Methods

- Operators not eligible to use the ICAO CERT shall select one of the 5 fuel used monitoring (FUMM) methods.
- No real priority/ranking between the methods. Each method uses different fuel measurement points.
- Deviation between the 5 FUMM is less than 5%

FUEL USE MONITORING METHODS

Method A

Method B

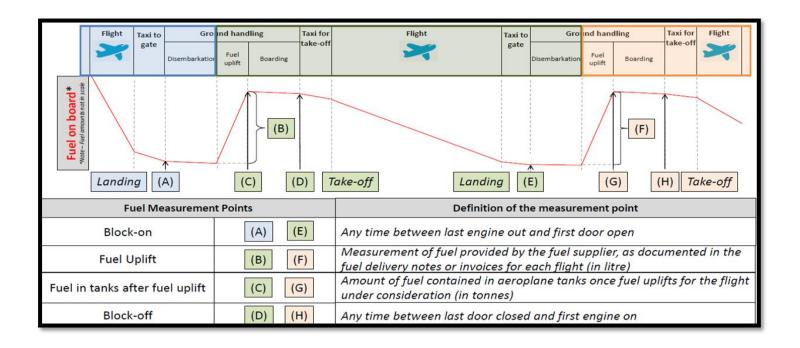
Block-off / Block-on

Fuel Uplift

Fuel Allocation with Block Hour



Different Fuel Measurement Points



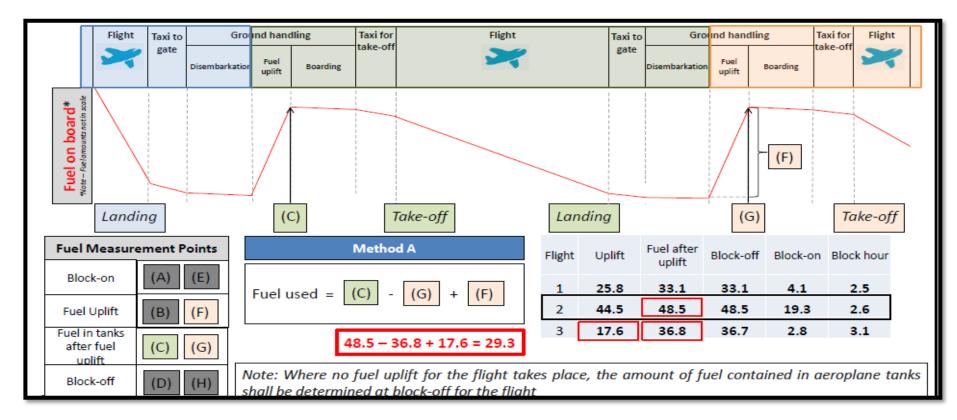


Methods A and B

- → They have always 3 measurement points
- → Used in the EU ETS

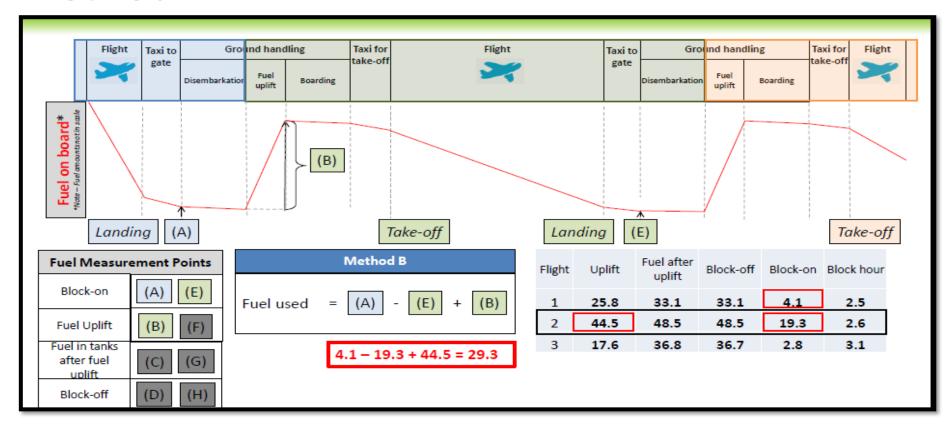


Method A



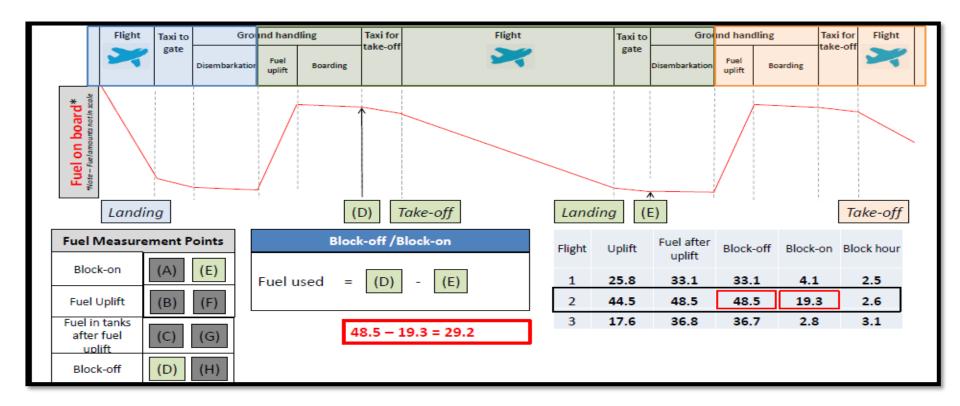


Method B



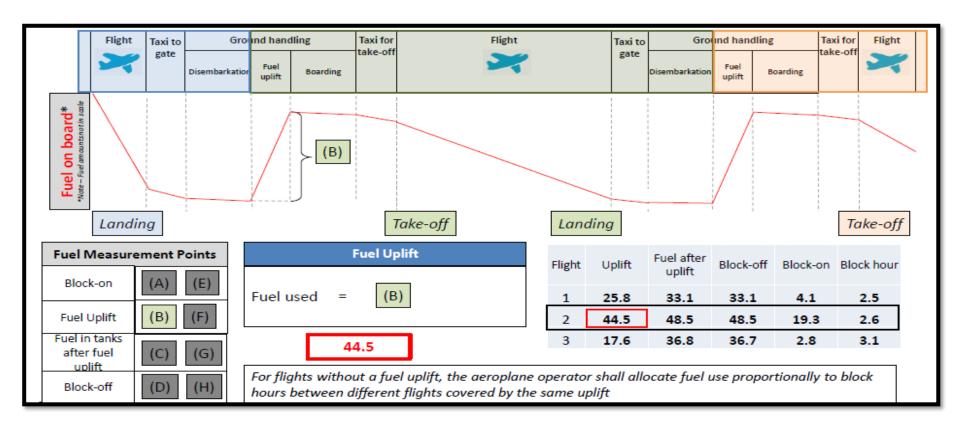


Block on-Block off



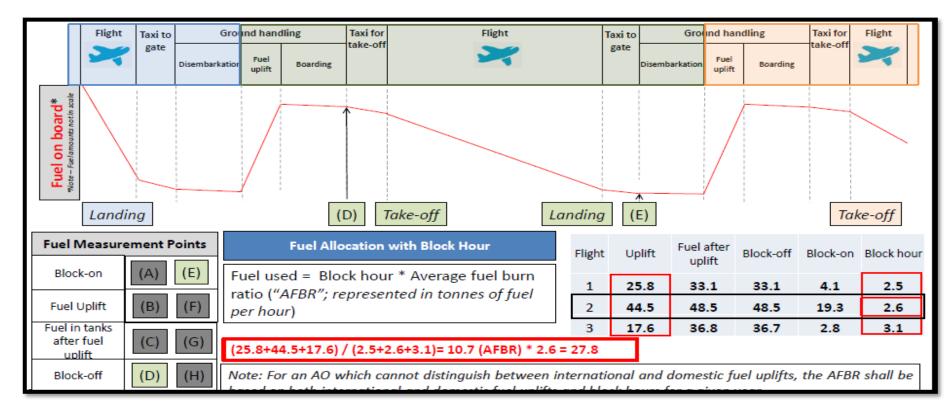


Fuel Uplift



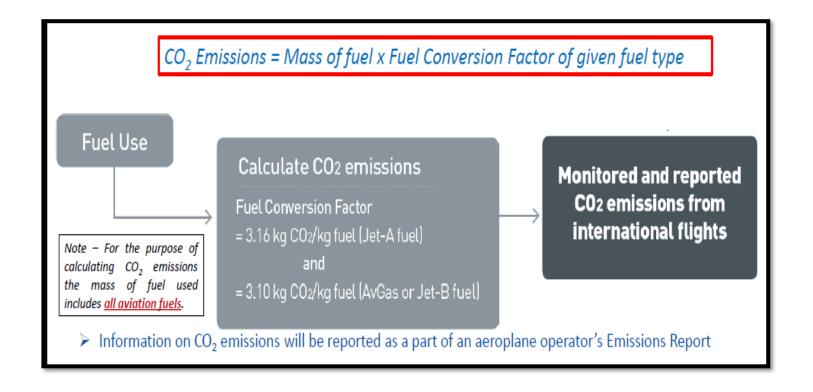


Fuel Allocation with Block Hour





Calculation of CO2 emissions from fuel used





Fuel Density

- The operator shall record the fuel density that is used for operational and safety reasons
 - Density is usually recorded e.g. in an operational, flight or technical log
 - Fuel density value may be:
- ☐ An actual fuel density value; or
- ☐ A standard value of <u>0.8 kg per litre</u>

 The operator shall detail the procedure for informing the use of fuel density in the EMP, along with a reference to the relevant documentation







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